twelve must die, and these figures may be regarded as probably below the mark where food is abundant.

The relative prolificacy of the rodents as compared with many of the carnivora which feed upon them does not come within the scope of Dr. Mitchell's paper, but it is a remarkable instance of the interrelation of the system of life upon our planet that those which are preyed upon should be on the whole more prolific than those which prey.

Possibly the shortest-lived mammals are to be found amongst the shrews, of which a solitary individual is tabled in Dr. Mitchell's records as having survived captivity for one month. Shrews are extremely difficut to keep alive under artificial conditions, and evidence has lately been produced to suggest that, in the case of the two commoner British species, the average duration of life is only about a year, but, since shrews are amongst the most prolific of mammals, this short period is more than sufficient for the maintenance of their numbers.

It appears that there is no rule which can be laid down in advance to govern the probable length of life of any given species. Size has very little to do with it, although in the same group the larger usually live longer than the smaller. The climate from which a bird or mammal comes has the smallest possible relation to its viability in captivity; in fact, not nearly so much influence as the nature of the cages, or enclosures, which the captive animal is to occupy, since Dr. Mitchell shows that a system of combining free access to open air with suitable dry shelters of small size offers the most ideal conditions for the health of captive animals. Strange to say, it is not animals from the tropics that suffer most from the London climate, but those from the Arctic, which seem to find a difficulty in altering the rhythm of their moults. Those from south temperate regions are even in a worse plight, since they have to face the fact that the conditions of winter and summer are reversed in the northern hemisphere.

A remarkable suggestion of Dr. Mitchell's is that animals from thickly populated countries are on the whole more difficult to keep alive in captivity than those from regions where men are less known. This applies especially to British birds, and Dr. Mitchell suggests that their lower viability in captivity in England, as compared with that of their immediate allies from any other part of the world, is probably due to their intolerance of man, without which unfortunately they would not have been able to maintain their existence as wild creatures.

NOTES.

THE meeting of the All-India Malaria Committee of the Government of India at Bombay in November last marks a revolution in Indian sanitation. For years past the

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nothing but quinine prophylaxis against malaria, and have not encouraged, or have even discouraged, mosquito-reduction—alarmed, apparently, at what appeared at first sight to be the cost of the latter measure. Owing, however, to constant discussions (in which NATURE has taken a part), another spirit has now shown itself. The conference passed a series of resolutions in which mosquito-reduction is at last recommended for India—years after it has been regularly employed elsewhere. This ultimately means the formation of a genuine sanitary service for the whole of India on the lines recently suggested by Sir R. Ross, Colonel King, and Dr. Simpson in *The Times*, and with the enthusiastic medical services which the Government has at its command we may expect great results in time. The Indian Press deals at length with the matter, and the *Madras Mail* remarks: "It is just fourteen years since Sir Ronald Ross, working in India—at Secunderabad—discovered the method of transmission of the malaria parasite from man to man by the anopheline mosquito. Malaria causes more sickness and mortality than any other disease in India; yet, knowing all about its method of transmission for the last fourteen years, what has been done in the interval in the way of practical application of the knowledge furnished by Sir Ronald Ross? Nothing! Verily, a prophet is without honour in his own country. There is hardly another country but has something to show—often most brilliant results. Now that the admission has been made that India has hitherto been on the wrong track, we again express the hope that something of a practical nature will shortly be done to mitigate the ravages of malaria in this country."

MR. GEORGE R. M. MURRAY, F.R.S., who died at Stonehaven on December 16, at fifty-three years of age, joined the Department of Botany of the British Museum in 1876, after having spent some time in de Bary's laboratory at Strassburg. He thus started his work at the museum well equipped for the study of the fungi. Murray approached with characteristic enthusiasm the task assigned to him by his chief, Mr. Carruthers, of building up the cryptogamic herbarium. There in the great collections, especially of fungi and algæ, lies the chief record of his work for nearly thirty years. His earlier work was on the fungi, but later he turned to the algæ, and in association with younger workers whom he had attracted to the museum, published a series of papers on the structure and affinities of certain genera. A number of these papers were brought together in the "Phycological Memoirs," which he edited (1892–5). In 1895 was published his "Introduction to the Study of Seaweeds," and in the same year he succeeded Mr. Carruthers as keeper of the Department of Botany. He next turned his attention to marine plankton, and accumulated a large amount of material, much of which he collected himself on various excursions on or across the Atlantic. He embarked on this new work with his usual energy and enthusiasm, but his scientific career was abruptly ended by a breakdown in health that necessitated his retirement. Murray's work was not limited to official duties. As a young man he was known as an able teacher and lecturer. He was for some time lecturer in botany at St. George's Hospital, and later at the Royal Veterinary College; and in conjunction with A. W. Bennett he brought out a text-book on cryptogamic botany. He was secretary to a committee which organised useful work of botanical exploration in the West Indies, and for some sessions he worked hard for his section at the British Association meetings. Until his health failed he was a keen supporter of the Linnean Society, serving on the council almost continuously from 1883 to 1900. He was elected into the Royal Society in 1897.

THE Board of Trade has been informed that the twelfth International Navigation Congress will be opened at Philadelphia on May 23, 1912, under the patronage of President Taft. Further particulars, including the conditions under which persons or corporations may participate in the congress, can be obtained from Lieut.-Colonel Sandford, general secretary of the congress, The Bourse, Room 344, Philadelphia, P.A. (U.S.A.).

THE death is announced, in his fifty-second year, of Mr. James Aitchison, who founded the business of Messrs. Aitchison and Co., opticians, about a quarter of a century ago, and as one of the founders of the Optical Society did much to promote study and research among members of the optical trade. An obituary notice in *The Times* points out that it was largely through his exertions that technical classes for opticians were formed at the Northampton Institute, Clerkenwell. Mr. Aitchison was one of the prime movers in calling the Optical Convention in 1905, and he was treasurer of the guarantee fund for the Optical Convention to be held next year.

THE death of Sir J. C. Inglis, the general manager of the Great Western Railway, occurred on December 19. From an obituary notice in *The Times* we learn that, as engineer to the Cattewater Harbour Commissioners, he constructed the Mount Batten breakwater at Plymouth, and subsequently was responsible for the Princetown Railway, Newlyn Harbour, and the Bodmin Railway. He became a member of the council of the Institution of Civil Engineers in 1897, and was elected president of the institution in 1908, and again for a second term in the following year, one of his last official acts in that capacity being the laying of the foundation-stone of the new building in October of last year. He was a member of the Royal Commission on Canals and Inland Navigations.

THE Paris correspondent of *The Times* announces the death of three distinguished scientific men, namely, Prof. Lannelongue, M. Radau, and Prof. P. Topinard. Prof. Lannelongue, who died on December 21, in his seventy-second year, was appointed in 1884 to the chair of pathology in the University of Paris, and later he exchanged this appointment for the professorship of clinical surgery. At the time of his death he was president of the Academy of Medicine, and was elected to the Academy of Sciences in 1895.—M. Radau, who was seventy-seven years of age, was a member of the Bureau des Longitudes and of the Academy of Sciences. For many years he contributed articles on astronomy to the *Revue des Deux Mondes*, and he was the author of "Mémoires d'Astronomie," among other works.—Prof. Paul Topinard, the distinguished French anthropologist, was born in 1830. From 1872 to 1880 he was in charge of the collections of the Anthropological Society, and in 1876 was appointed professor at the School of Anthropology.

THE following lectures will be delivered at the Royal Sanitary Institute during January, 1912:—"Fresh Air," Prof. H. R. Kenwood; "Problem of After-care of Sanatoria Patients," Dr. T. D. Lister; "Employment of Patients in Sanatoria," Mr. M. S. Paterson; "Anti-tuberculosis Dispensaries," Dr. D. J. Williamson; "Open-air Schools," Prof. R. P. Williams. These lectures are arranged in connection with an exhibition illustrating the materials and methods of construction of economical forms of sanatoria schools, hospitals, and other temporary buildings, to be held in the museum during January.

THE jubilee annual meeting of the Yorkshire Naturalists' Union was held at Heckmondwike, on December 16, at the place where fifty years ago the union had its birth. There were more than three hundred members present, including delegates from thirty-eight affiliated societies of the Yorkshire Naturalists' Union. The presidential address of Mr. Alfred Harker, F.R.S., on "Petrology in Yorkshire," was delivered. Mr. T. Sheppard resigned his position as honorary secretary, and in view of his nine years' work in that position was elected an honorary life member of the union. Mr. W. Cash was similarly honoured. Mr. J. W. Taylor, of Leeds, was elected president for 1912. The new secretaries are Dr. T. W. Woodhead, and Mr. W. E. L. Wattam, Technical College, Huddersfield. The annual meeting for 1912 will be held at Hull on December 14.

A VALUABLE contribution to our knowledge of the use of iron in early Egyptian times has been made by a discovery during the excavation of the pre-dynastic cemetery of El Gerzeh, about forty miles south of Cairo, reported in the December issue of *Man*. Here, in an undisturbed tomb, a set of iron beads, associated with others of gold, carnelian, and agate, was found on a corpse. Prof. W. Gowland reports that they consist of hydrated ferric oxide, none of the original iron having escaped oxidation.

THE part played by the Jews in the preservation and revival of learning during the Middle Ages is the subject of a scholarly pamphlet by Dr. M. I. Schleiden. Agriculture, the greater industries, such as silk-growing, dyeing, and weaving, were all encouraged by them. The writer claims that they left no branch of science and learning untouched, and at the close of the Middle Ages handed on the results of their labours to the races which were now rising to a sense of their responsibilities. The value of the pamphlet is enhanced by full references to the literature of the question.

IN the seventh Bulletin of the Archæological Survey of Nubia, the exploration gradually extends southwards. While the early pre-dynastic and middle periods are unrepresented, the number of early dynastic graves shows little signs of diminution, and their contents are actually richer, indicating the centre of an early dynastic culture of a Nubian type, characterised by remarkable local types of pottery, copper implements, gold work, and stone work typical of Egypt in the latest pre-dynastic period or in the first dynasty. The crania collected have been sent to this country for examination by Prof. Elliot Smith, but, so far as the material has been examined, it indicates early negro immigration with a possible admixture of other racial elements.

IN the first part of vol. v. of the Journal of the Gypsy Lore Society several correspondents contribute accounts of the funeral rites of a well-known member of the tribe, Isaac Heron, who died last year at Sutton-on-Trent. Gypsy rites of interment have perhaps never been more carefully examined than in this valuable contribution. The corpse was buried in an oak coffin large enough to admit the body, which was dressed in stockings, pants, and a white linen shirt, and covered with a white shroud. Under the corpse his overcoat, lounge coat, waistcoat, and trousers, all of which were turned inside out, were laid. Some money and jewellery, the amount of which was not disclosed, were placed in the pockets of the dead man. After the funeral, which was performed in a Christian cemetery, his van was dismantled. The wheels, shafts, harness, and horse nosebag were placed inside, the contents were soaked in paraffin, and the conveyance was burnt. Among other peculiar features of the rite, the hands of the dead man were laid close to his sides, and a candle was kept burning from the time of death until the body was removed.

THREE papers in the second part of *Sitber. Naturhist. Verein d. preus. Rheinlande u. Westfalens* are devoted to the fauna of Lake Laacher (Laacher See), near Andernach, Messrs. R. Schauss, C. Röttgen, and O. le Roi dealing respectively with the crustaceans, the beetles, and the molluscs.

IN the report for 1911, the committee of the Bristol Museum and Art Gallery records the debt of gratitude owed by the city to the late Lord Winterstoke, by whom the Art Gallery and a considerable proportion of its contents were presented. When this gallery was opened in 1905 it contained very few pictures, whereas the value of those now exhibited is estimated at 42,000*l*. In recording the loan of a collection of big-game heads from British East Africa, the compiler of the report includes in the list the white-tailed gnu and the blesbok, both of which are exclusively southern species. Possibly the first name may be a mistake for the white-bearded gnu, but it is difficult to guess what species has been mistaken for the blesbok.

IN the Proceedings of the Zoological Society for 1902 Mr. R. Shelford recorded the mimicry of wasps belonging to two distinct genera by Bornean longicorn beetles of the genus Nothopeus, the imitation extending not only to form and colouring, but likewise to habits, and being so close that native collectors could with difficulty be induced to catch the beetles. A third instance of such mimicry has been described in West Africa in the case of a beetle allied to Nothopeus, the mimicked wasp being a fossorial species. To these instances Mr. C. Ritsema (Notes Leyden Mus., vol. xxxiv., part i.) adds a fourth, in which the widely spread *N. hemipterus* imitates in Nias Island the fossorial wasp *Macromeris splendida*, both insects being black with a pronounced metallic-blue sheen, especially on the wings. The author suggests that each of the eight species of Nothopeus mimics a wasp.

IN 1882 Sir R. Owen described the remains of a turtle from the Cretaceous of Queensland as the type of a new genus and species under the name of *Notochelys costata*, the generic name being subsequently changed, on account of preoccupation, to Notochelone. Until quite recently nothing more has been known of this reptile; but in No. 10 of the Annals of the Queensland Museum Mr. C. W. de Vis provisionally refers to it two imperfect skulls from, presumably, the same horizon in another part of the country. The larger and less imperfect of these indicates a turtle apparently nearly allied to existing forms, the symphysis of the lower jaw being short, and thereby indicating that the suggested affinity with the Eocene Lytoloma (Cat. Foss. Rept. Brit. Mus., part iii.) is invalid. In describing the second specimen, which he regards as an immature skull, Mr. de Vis states that "the sclerotic plates are in place," thereby unconsciously showing, if the identification be correct, that it is not chelonian at all. Moreover, the tooth-like projections on the margins of the jaw described as "pseudodonts" appear from the figure to be true teeth, recalling those of mosasaurians. Whatever may be the nature of this problematical specimen, it certainly does not justify the assertion that Notochelone is a generalised type which cannot be included in any existing family.

DR. C. GORINI, writing in the *Atti dei Lincei*, xxi. (2), 6, describes some interesting observations on the microbiology of cheese. It appears that certain acidopresamigenous and acidoproteolytic bacteria are capable of existing at such low temperatures as 10° to 50° C., and thus the ripening of cheese can take place during winter storage. Moreover, the enzymes of these bacteria continue to act at even lower temperatures.

A SHORT flora of Cambridge forms the subject of part iii., vol. xvi., of the Cambridge Philosophical Society's Proceedings, the author being Mr. A. H. Evans, of Clare College. It is prefaced by a short historical account of the chief Cambridgeshire botanists. Unlike Babington, the author classifies the districts of the county according to their geological formation. In addition to phanerogams, ferns, and Characeæ, the flora contains lists of mosses and lichens by the Rev. P. G. M. Rhodes; algæ, including diatoms, by Dr. G. S. West; and fungi, by Mr. F. T. Brooks.

WE have received the current number of the National Poultry Organisation Society, which deals with several minor but important problems in connection with the poultry industry, especially with the cooperative aspects, which it aims at fostering. The value of our imports of eggs and poultry continues to increase, and during the first eight months of this year amounted to nearly 4¾ million pounds sterling, nearly half of which came from Denmark.

ONLY a short time ago we had to chronicle the foundation by the Americans in the Philippines of an agricultural college and a journal, *The Philippine Agriculturalist and Forester*. The first numbers contained articles of local interest only, but No. 5, now to hand, already contains a very presentable investigation into the effects of some stimulants upon rice. The additions to soil cultures of small quantities of borax, manganese sulphate, mercury chloride, ferrous sulphate, nickel sulphate, zinc sulphate, and aluminium sulphate produced favourable effects, whilst copper sulphate was harmful.

THREE years ago the Behar Planters' Association appointed an expert to conduct experiments for the purpose of ascertaining whether flax could be profitably grown and manufactured on Indian estates, the buildings and vats of which could be utilised for retting and scutching. A report has now been issued showing the financial returns during the past season, and thus putting the planters in a position to judge whether the new crop is as profitable as indigo. The quality of the flax is satisfactory, good prices being also obtained for the seed. The report forms Bulletin 25 of the Agricultural Research Institute, Pusa.

THE current number of *The Agricultural Journal of the Union of South Africa* contains the unpleasant news that the much-dreaded San José scale, *Aspidiotus perniciosus*, Comstock, has found its way into the Transvaal. The discovery was made by Mr. J. W. Moore, of Potchefstroom, in working up a collection, and steps were at once taken to exterminate the pest. In the same journal an account is given of a new and very promising breed of maize picked out from a crop of Hickory King that had grown alongside Virginia horsetooth. Hitherto the yield has proved exceedingly good.

AMONG the sclerophyllous woodlands recognised by Dr. Schimper as a feature of those regions situated in the warm temperate zone where the rainfall coincides with winter is the chaparral, or dwarf forest of southern California. An account of this formation by Mr. F. G. Plummer, published by the United States Department of Agriculture as Bulletin 85 of the Forest Service, indicates that it is a truly natural type, occurring between the altitudes of sea-level and 8000 feet, and confined to the littoral district from Monterey to San Diego. True chaparral consists primarily of dwarf trees—not shrubs—stunted by reason of an insufficient rainfall. It is economically important as a ground cover for the watershed whence the water supply is obtained for irrigation and municipal purposes. About forty different species of trees are combined in the formation; the most desirable are those which produce good shade, are not inflammable and make vigorous growth, such as *Rhus laurina*, *Prunus ilicifolia*, *Heteromeles arbutifolia*, and species of Quercus; less desirable, but dominant are species of Adenostoma and Ceanothus.

THE fifteenth volume of Transactions of the Leicester Literary and Philosophical Society, 1911, has a paper by Mr. H. Quilter suggesting an explanation of the presence of *Sambucus Ebulus*, the dwarf elder, or Danewort, in Leicestershire, and perhaps in Great Britain generally. It is usually regarded as an introduced plant, and popularly supposed to have been brought by the Danes. The seven localities where it is recorded contain Roman remains. Anglo-Saxon medicinal books, deriving from Roman sources, mention the shrub under the names Low-wyrt and Weal-wyrt, the latter term implying that it was a denizen. The name Danewort does not occur until 1538. Mr. S. B. Bratley has some interesting notes on micrococci from diseased larvæ. Among other evidences of the work being done by the society in the popularisation of science is a good lecture on trees by Mrs. C. D. Nuttall. This contains a useful sketch of afforestation problems, and an interesting reference to the work of the Midland Re-afforestation Association. Successful experiments have been made in raising plantations of trees on the waste coal surfaces and pit mounds of the Black Country. Some trees are growing well in pure coal-dust. The poplar, willow, ash, sycamore, and Wych elm do best. Oaks and conifers take less kindly to the peculiar atmosphere and soil. This is an interesting undertaking.

ABOUT three years ago the attention of the Royal Dublin Society was directed to the occurrence of considerable deposits of modern marine shells west of Mallaranny, in Co. Mayo, at heights of from 100 to 800 feet above sea-level. Mr. J. de W. Hinch (*Irish Naturalist*, 1911, p. 189) has now cleared up any doubts regarding their origin, by showing that the common limpet is by far the most prevalent form in these deposits; that the other species present are all edible; and that traces of fire occur on the sites where they occur. Mr. Hinch concludes:—"The deposit is certainly not a raised beach, nor a Glacial deposit. In my opinion it is a rock shelter of prehistoric times." The modern talus has in places grown over and entombed a large number of the shells.

MR. J. M. CLARKE has published in a separate form his "Observations on the Magdalen Islands" (New York State Museum Bulletin 149, 1911). These islands lie in the Gulf of St. Lawrence, north-east of Prince Edward Island, and are quaintly described as "sea-wracked [racked?] remnants of continental land." They are occupied by about 7000 persons, chiefly of French origin. A new term is introduced (p. 12), the "*demoiselle hills*; rounded, symmetrical, beehive-shaped elevations with grassy surfaces and separated by shallow or deep cauldron-like depressions." It appears that this term refers to what may be styled, on the same grounds, mammillations; the form, as we know in Jura, has always appealed thus to navigators. Mr. J. W. Beede describes and illustrates the Lower Carboniferous fossils from the islands, including several new species of Productus.

THE Bulletin of St. Louis University, vol. vii., No. 5, treats of seismology. At this university a Wiechert 80 kg. horizontal seismograph has been established. The records are made on a surface of smoked paper. From January to June, 1908, 19 disturbances were noted. During the same period, but with apparatus which records photographically, we see that 52 earthquakes were noted at Victoria, B.C., 47 at Toronto, 160 at Hamburgh, and 108 at Stonyhurst. All these observations have been corroborated by records obtained at other stations, and are therefore known to represent earthquakes which have disturbed very large areas. Fifteen colleges in the United States and one in Canada have been equipped with instruments similar to the type adopted at St. Louis.

TO *The Monthly Weather Review* for May, published by the U.S. Weather Bureau, Dr. O. L. Fassig contributes an interesting article on "The Trade Winds in Porto Rico," based on hourly observations for ten to twelve years at San Juan. The island lies wholly within the zone of the north-east trades, and the tables show a prevailing wind-direction from north-east to south-east during 77 per cent. of the entire year, or an aggregate of 281 days, and from south during 14 per cent., or 51 days. In the diurnal period, from about 9h. a.m. to 10h. p.m., the prevailing direction is from the east for the entire year, and from 10h. p.m. to 9h. a.m. from the south-east. The night winds, being lighter, vary somewhat more than those of the day. The average hourly wind-velocity for the year is about 11 miles; the minimum, 6 miles, occurs at sunrise, and the maximum, 16 miles, at about 2h. p.m. Judging from the movements of the clouds, the average depth of the trade-wind current probably does not exceed 10,000 feet; the lower clouds are wholly within the trade-wind drift. The changes in temperature due to change in the direction of the wind are, as a rule, very small.

IN a paper on the analytical basis of non-Euclidean geometry (*American Journal of Mathematics*, xxxiii., 3) Dr. W. H. Young, F.R.S., makes the following suggestive remarks:—"There is, it seems to me, a tendency at the present time to throw dust in the eyes of the mathematical public, or rather of the schoolboy public, in respect of the step taken which corresponds to Euclid's eleventh axiom. To efforts, now recognised by all mathematicians to be abortive, towards proving the eleventh axiom have succeeded treatments of the subject-matter of Euclid for future engineers and others which seem to gloze over the difficulty this axiom involves. I have recently proposed" (Quarterly Journal, 1910, pp. 353–63) "to emphasise the empirical character of the axiom by giving it a form which challenges attention, a form, moreover, having the double advantage that it relates to bounded space, and can be experimentally verified by the dullest schoolboy, even by one to whom the ideas of an angle represents an incompletely solved difficulty. If, on the other hand, we leave the region of school books, we find for the most part an air of unreality and half-heartedness in the treatment of the subject." In his present paper Dr. Young shows how the refinements of modern analysis give a consistent account of the three geometries which arise out of the alternatives for the eleventh axiom.

MESSRS. BURROUGHS, WELLCOME AND CO. have sent us a copy of the "Wellcome" Photographic Exposure Record and Diary for the year 1912. This, as many of our photographic readers are aware, consists of a very neat, nicely and strongly got-up pocket-book, and contains the essence of photographic information in tabloid form. In it are given the directions and observations on such matters as exposure, development, intensification, and the other procedures which go to the making of pictures. The information is very general, and the user of any plate or camera will find it equally serviceable. Instructions and explanations are given with regard to such topics as factorial and time development, machine, tank or stand development, the oil-pigment process, contact printing by artificial light, colour photography, &c. All the figures and factors, based upon actual experiment, have been worked out for all the principal films and plates, and are collected in a neat, convenient form. By the ingenious exposure calculator attached to the cover, correct exposures under all circumstances can be easily secured. In addition to all this photographic information, there are pages for diary and exposure notes, so that the book serves as a pocket-book as well as a work of reference. It should be noted that three separate editions of the pocket-book are published, specially adapted for the northern hemisphere and tropics, the southern hemisphere and tropics, and the United States. Those who have not yet taken advantage of the valuable aid this pocket-book is when travelling about the world, or even staying at home, should make the experiment now and use one. The writer has for several years always possessed himself of a copy, and while he has had the occasion to employ all the three editions, he has found them most valuable in making the exposures, in recording the data, and in many other useful ways.

Some novel conclusions in reference to the osmotic pressure of colloids are given by Messrs. Moore, Roaf, and Webster in the October issue of *The Biochemical Journal*, in a paper on the osmotic pressure of casein in alkaline solutions. It has sometimes been suggested that the osmotic pressure of such substances is due to the presence in them of small quantities of ash. But it is found experimentally that alkali moves against the osmotic pressure to the same side of the membrane as the colloid, with which it enters into combination. The authors conclude that the supposed impermeability of the membrane to ions is fictitious, and that its function is merely to hold together the colloidal aggregates by which the crystalloid is attracted and made to traverse the membrane. The thirst of the casein for alkali illustrates the manner in which the colloids of living cells can extract and concentrate crystalloids for their purposes from infinitesimally low amounts in the fluids bathing them, such, for example, as bone formation from the excessively low concentration of calcium ion in the blood, the formation of calcareous and siliceous shells in fresh-water and marine organisms, and many similar cases. Such concentrations arise from affinities of a molecular type between colloids and crystalloids, which vary from time to time, so causing periods of uptake and deposition in a rhythmic manner.

The Patent Office Library is well known to all scientific workers in London. The liberal yet careful manner in which additions are made to the library, the wide range of scientific periodicals and journals, and the fact that it is available from 10 a.m. to 10 p.m., places the library in a unique position in London. The bookshelves are open to the visitors, a much appreciated privilege, but one requiring an intimate knowledge of the system of classification adopted if the time of the visitor and officials is not to be wasted. The new series of subject lists now being issued, while preserving the same form and general arrangement as the former one, is arranged so that the headings contain certain marks indicating the location of classes of books in the library. The most recent subject list in the new series deals with works on peat, destructive distillation, artificial lighting, mineral oils and waxes, gas lighting, and acetylene. It forms a pamphlet of 104 pages, and is obtainable at the Patent Office for 6*d*.

The causes of variations in the mineral oils of the United States and other countries have given rise to many investigations and discussions. Not only do these differences exist in oils found in separate regions, but there are extreme variations in many oils occurring in adjacent localities. It is a plausible hypothesis that the transport of the oil from the lower strata may have been effected, or at least assisted, by capillary action, and during the passage upwards a fractionation of the oil will take place. Day showed that the unsaturated hydrocarbons are less diffusible than the paraffin hydrocarbons, and Gilpin and Cram confirmed and extended this view by showing that when petroleum is allowed to diffuse through tubes packed with Fuller's earth, the unsaturated hydrocarbons collect in the earth of lower sections of the tubes, while the paraffins tend to accumulate in the lightest fraction at the top of the tube. Similar experiments have been made by other observers. Additional evidence is given in Bulletin 475 of the United States Geological Survey, on "The Diffusion of Crude Petroleum through Fuller's Earth, with Notes on its Geologic Significance," by J. Elliot Gilpin and Oscar E. Bransky. They show that when mixtures of benzene and a paraffin oil are allowed to diffuse upward through a tube packed with Fuller's earth, the benzene tends to collect in the lower sections, and the paraffin oil in the upper, sections of the tube. Crude petroleum under similar conditions also undergoes a fractionation, and repeated fractionation showed that there is a tendency to the production of mixtures which will finally pass through the earth unaltered. Fuller's earth tends to retain the unsaturated hydrocarbons and sulphur compounds in petroleum, thus exercising a selective action upon the oil.

We have received a reprint from the *Rivista di Fisica Matematica e Scienze Naturali*, Pavia, of a suggestive memoir by Prof. P. Palladino entitled "Les Composés Chimiques dans l'Espace," in which some novel ideas as to the constitution of matter are put forward. The basis of the hypothesis is stated to be essentially "the unity of matter and its possible groupings," and the author believes he has arrived at the form and relative dimensions of the atomic groupings of the unit of matter, or "quantities of combination," of the chemical elements. The memoir is illustrated by seventy-two geometrical figures representing the structure of the atoms and molecules of the principal elements and their compounds, and the text is interspersed with numerous graphic symbols, which act as a convenient notation to represent these various geometrical shapes of the elementary atoms and the molecules of their compounds. Definite shape is attributed to the unit of matter, namely, that of a tetrahedron; thus, for instance, the atoms of oxygen and of phosphorus are supposed to be built up of five tetrahedra, while those of hydrogen are composed of five polytetrahedra, each in turn composed of five smaller tetrahedra. The unit tetrahedron is supposed to be, in turn, composed of a number of electrons. The tetrahedra may be arranged in either a closed or an open manner in many cases, such as in those of oxygen and phosphorus, the difference of structure accounting for the existence of two forms of the same element, the less stable form (such as yellow phosphorus) corresponding to the open arrangement, and the more stable (red phosphorus, for example) to the closed assemblage. Prof. Palladino traces numerous chemical reactions and physical relationships to the forms which he thus attributes to the elementary atoms and the molecules of their compounds, and the whole memoir is both ingenious and highly suggestive.

A second edition of Dr. Arnold Berliner's "Lehrbuch der Experimentalphysik in elementarer Darstellung" has been published by Mr. Gustav Fischer, of Jena. The first edition of the work was reviewed in the issue of Nature for August 4, 1904 (vol. lxxiv., p. 317).

Under the title "Abhandlungen über Dialyse (Kolloide)," three of Thomas Graham's papers have been issued as No. 179 of Ostwald's *Klassiker der Exacten Wissenschaften*. The translation has been made by E. Jordis, who has also added a biography and bibliography, together with a series of critical notes.

Erratum.—In the summary of Dr. Tutton's Cantor lectures on "Rock Crystal," given in Nature of December 21, a line of type was unfortunately omitted.